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The Automobile

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THE AUTOMOBILE ON PARADE—THE PRIZE WINNER AT BRIDGEPORT.

The Bridgeport Automobile Parade.

That the automobile may be made "a thing of beauty and of joy" was plainly evident to the thousands of persons who flocked to the Washington Park at Bridgeport, Conn., on July 4, to watch and take part in the automobile parade. This event, which was the feature of the day in Bridgeport, and besides one of the largest and most impressive automobile parades on record, was arranged by the Bridgeport Post and Telegram. Forty-two vehicles, of all types and sizes, plain and ornamented, were in line, and their proud occupants were continuously cheered along the line. A number of the vehicles were artistically decorated, and the judges, Messrs. Gouch, Plumb and Oliphant, had some difficulty in deciding which was the handsomest decoration and worthy of the silver cup offered for a prize by Mr. Grimm, of the Locomobile Co. They finally decided to award it to Miss Emma Guy Pike, who held the lever of the "Locomobile" illustrated on our front page, and had as her guest Miss A. M. Kennedy, of New York. The sides of this automobile, which had a sort of a Japanese effect, were covered with crepe paper, Easter lilies and green foliage of the same material. The front and rear of the carriage were extended by ornamental figures, and paper lanterns completed the effect. The steering bar was covered with roses.

Other vehicles which attracted special attention were those of Messrs. Henry W. and George W. Hills, H. E. Curtis and E. Sherman. A great variety of vehicles were in line, varying from a delivery wagon to a motor cycle, and every known motive power was represented. A number of uniformed bicycle clubs took part in the parade, also competing for a prize, and aided to make this "horseless" event one long to be remembered by the citizens of Bridgeport.

The Industry in Germany.

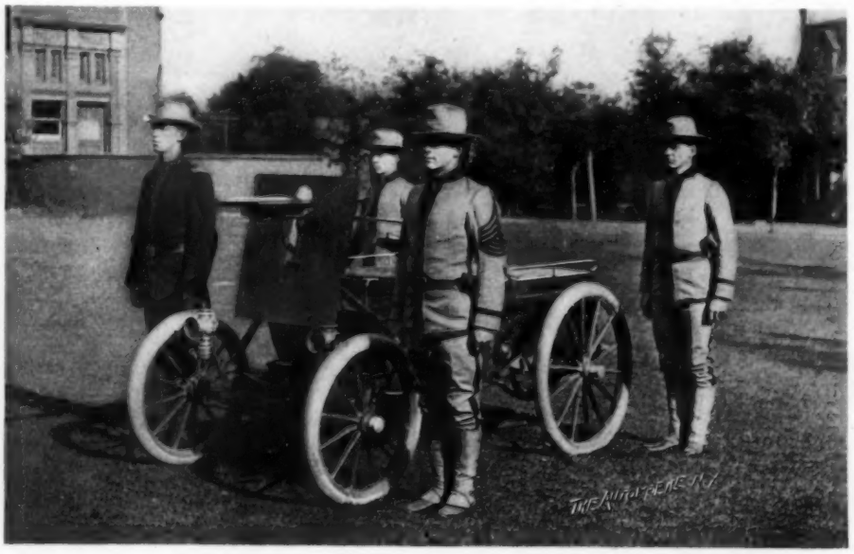
The automobile industry is being rapidly developed in Germany. A large amount of capital and energy is being expended, and apparently the German business men have great confidence in the future of automobilism. While in France, the object aimed at has been to produce carriages for sporting and pleasure, in Germany the manufacturers have given attention to the making of automobiles for carrying goods. The two kinds of motive power most in favor are electricity and gasoline, although steam power is being experimented with. For heavy service, such as brewery wagons, drays and omnibuses, the gasoline vehicle at present seems to have the preference owing to the fact that the cost of fuel is low and that it can be run long distances. For city service, however, electricity is gaining a strong foothold, and a number of charging stations have recently been established in the larger cities.

Experimental Trip of Major Davidson's Automobile War Carriage.

The accompanying illustration shows the automobile war carriage without tent and equipment, designed by Major Davidson, of the Northwestern Military Academy, at Highland Park, Ill., and four of the students of the academy, standing at attention. This crew, in company with Major Davidson, left Fort Sheridan on Thursday, July 19, with a message from Major-General Joseph Wheeler to Lieut.-General Nelson A. Miles, Washington, D. C. One of the tires of the carriage after passing through Chicago, met with a serious accident, and further progress had to be delayed until a new tire was procured. The trip was then continued, and the itinerary will include Toledo, Cleveland, Buffalo, New York and Philadelphia. In reference to the object of the trip, Major Davidson writes to THE AUTOMOBILE as follows:

"We are not endeavoring to make any speed records any more than we will travel as fast as consistent. The experiment is more of a test to find out how much the automobile will stand in the way of a heavy load and hard usage. The matter of speed is merely a question of gear and how much risk the driver will run both personally and as to teams. While having a legal right to half the road, we feel that there is a moral obligation due to drivers and horses, and, while we find it makes a great difference with the number of miles traveled in a day to stop more or less for carriages, we prefer to do it rather than have serious runaways."

The carriage weighs, with gun and equipment, 1,600 pounds. With a corps of four, about 2,300. The crew camp and do their own cooking en route.



MAJOR DAVIDSON'S AUTOMOBILE WAR CARRIAGE.

The International Automobile Congress.

The International Automobile Congress was held in Paris from July 8—14. The first session was held in the Palais de Congres, within the Exposition grounds, and the subsequent ones at the house of the French Automobile Club. M. G. Forrestier was chosen president and Sir David Solomons, Ruys Orban and Count de Dion, vice-presidents.

The work was divided into five sections, as follows:

Section I—Steam, gasoline and miscellaneous engines. Section II—Electric motors. Section III—Transmissions, running gears and carriage work. Section IV—Traction efforts. Section V—Historical, economical and international questions. The attendance at the first session was about 150.

The Gender of the Automobile.

In a determined effort to standardize everything that will bear standardization, the celebrated Academie Francaise has lately set itself the problem to define the gender of the automobile. It succeeded, as it always does, in settling the question to the satisfaction of its members, though in this particular instance their decision did not coincide with the popular verdict. The latter seems to be that the automobile should be a "she," while the learned academy will have us say: "All hail to the automobile, his day has come." And while this decision may be considered from an Anglo-Saxon standpoint as another peculiarity of the Gallic tongue, still, we may as well accept the verdict and ourselves christen the automobile "the master" of all means of transportation.

The Lightest Automobile.

By Robert H. Thurston.*

(Concluded from July issue.)

As to materials, we have seen that those available are best in the order of their relative values of ratio of strength to weight, always provided that they are of the class available for the particular construction to be attempted and are commercially produced for the market. The so-called rare metals, for example, whatever their promise, need not occupy our time until they can be reduced, as has been aluminium, to the rank of "useful metals." Here are some facts of interest in this connection:

AVAILABILITY OF METALS IN AUTOMOBILES.

Metal.	Wt. per cu. ft. lbs.	Tenacity lbs. per sq. in.	Length supported. ft.
Cast iron	444	16,500	5,351
Common bronze ...	525	36,000	9,874
Wrought iron	480	50,000	15,000
Hard-struck steel...	490	78,000	22,922
Aluminium	168	26,000	22,285
Fine tool-steel	490	156,000	44,570
Watch-spring (fine).	490	312,000	89,140

In the above table it is at once seen that steel is the only metal, on that list at least, which is well-fitted for our present purpose, and it has no rival. It is, however, true that some alloys of aluminium promise for some special purposes to prove satisfactory. It may be generally asserted that, as a rule, some grade of steel will prove the proper substance for all parts of our machinery and metal constructions, whether it be steel castings for cylinders and framing, where casting is necessary, or for rods and shafts and links in other details, and especially in running parts. In the latter class, a steel of about 0.8 per cent. carbon and otherwise pure, withstands shocks best; while the regular work of the power-transmitting parts can be accomplished best, from our present point of view, by the employment of other grades. In compression, steel tubes seem now to be likely to prove best, and for pure tenacity where retention of shape is not necessary, the fibres, as silk and sinew, have highest values. A material incapable of carrying, say, five miles of its own weight, would be ruled out of our category of available materials at once, and we are likely to insist on a minimum limit two or three times this magnitude. It is possible that, in some directions, we shall find our limit to be one of costs not so much of material as of its working. Mr. Maxim tells the writer that his engine is worth about its weight in silver; that of Professor Langley is probably worth its weight in gold. But if we cannot use silk and sinew we may use hemp and manila. Hemp carries about 75,000 feet of its own substance in form of rope or line. Linen, tested for the writer in the Sibley College laboratories, carried about 40,000 feet; silk supported about 150,000 feet; human hair about 80,000 feet as a maximum, ranging from 50,000 upward; sinew or silkworm gut, carried about 90,000. Catgut and raw hide supported, respectively, 5 miles and 3 miles; fine sinew from the flyhook of the writer, carried 8 miles; a violin e-string came up to about 7 miles. Some of these materials may thus find use in special construction, as in racing machines, if not in regular building for the market. The best woods, as ash, pine and hickory, approximate the values of steels of, respectively, 175,000 pounds tenacity, 180,000, and, in the case of hickory and hemlock, singularly different woods, 200,000. The woods are equivalent, thus gauged, to the stronger steels. The bronzes have no special value for us; the aluminium alloys in some cases promise well; magnesium alloys may prove in some cases still more promising, the metal being much lighter and somewhat stronger than aluminium. It is possible, however, that we may some time find a way of securing the total inherent molecular tenacity of fine steel, which there are indications leading us to believe may be as high as 400,000 pounds per square inch, giving a self-supporting power measured by a suspended rod twelve or fifteen miles long, in which case we shall not look elsewhere for material when that metal can be used.*

We may then conclude that, in the construction of the parts of the body, running gear, accessories and motor-apparatus, the principles above enunciated regarding the choice of materials are to be our guide. The use of the woods combining in highest degree lightness and strength, is to be adopted for the body and wherever wood is a suitable material; unnecessary weighting with upholstery and unessentials must be carefully avoided; fibre and textiles, where used, should be of the nature of silk and sinew, where practicable, and hemp rather than the weaker sorts of fibre. Nothing has yet appeared better than steel for the metal parts, and this should be as hard as can be satisfactorily worked in the lathe and planer and milling machine. Proportions must be decided by the expert and scientifically trained designer and constructor, shapes must be just as carefully studied, and, if necessary, felt out by systematic investigation with the aid of the testing machine, and it must always be particularly remembered that the joints and connections of parts must be just as safe as the parts themselves.

The motor, in the case of the steam-automobile taken in illustration, should be designed with careful reference to the best current practice in other fields, especially in the work of the builder of the naval torpedo boat, and in that of the Maxims and the Langleys working on aeronautic constructions. Presumably a compound engine will be frequently if not usually employed; for the smaller the machine the greater the saving, proportionally, by compounding, and, as two cylinders are required in any event, it is about as cheap a construction as the alternative, the pair of simple engines. Three-cylinder single-acting engines offer some advantages. The boiler will be undoubtedly a special make for this particular work. Possibly the Serpollet system may come in; but it will be apt to be one in which an enormous mass of heating surface is crowded into small space and weight, and in which only very pure water can be safely used, and this means some system of condensation possibly; although a supply of rain-water can usually be found at all stopping places in this section of the country, and will do as well. Superheating the steam, if found practicable, will prove a source of considerable economy, and an engine designed in such manner as to be comparatively free from water of condensation in its cylinders at all times will be found to demand very much less steam than one otherwise constructed, and will have the advantage of a correspondingly small demand for coal and feed-water. Other than this, the provisions of strength without excess weight, and of simplicity and durability and handiness, are the points toward which the ingenuity and knowledge and experience of the best designers must be directed. The amateur is not likely to succeed; for this work demands a complete knowledge of all available materials, of the best of current practice in all fields of related work, and of a skill and experience in detail of designing which only a competent expert with ample experience in the work undertaken can possess. Even the most competent of designers of to-day, however, will find that he has much to learn in this new department of engineering construction, and must content himself to receive instruction through further experience under many new conditions.

That the automobile has now come to stay with us is unquestionable; but among all those brought forward it will be found that few will be chosen, and, as in all fields of invention and of engineering construction, a perfect success can only be slowly approximated through a long process of evolution, in which patience and capital will play as important parts, at least as essential parts, as engineering skill and ingenuity.

*Director of Sibley College, Cornell University, and Hon. Mem. the Automobile Club of America.

*Notes on the Materials of Aeronautic Engineering; R. H. Thurston, Proceedings of the International Conference on Aerial Navigation; Columbian Exposition, Chicago, Ill., U. S. A., 1893.

When Starting Out.

Have an abundance of all supplies.

See that all nuts and bolts are tight.

Don't leave your wrench and other hand tools behind.

Examine the brakes to see that they are in working order.

Make sure that all electrical connections are tight and in good order.

Fresh gasoline for a gasoline motor is better than to economize with old.

Inspect the lubricators to see that they are in working order, and have a sufficient quantity of lubricant for the trip.

See that the chain is in good condition. It needs an occasional cleaning as well as a frequent application of graphite lubricant.

NEW STYLES OF AUTOMOBILES

The Stearns Stanhope.

Figure 1 shows a stanhope of the gasolene type made by F. B. Stearns & Co., of Cleveland, Ohio. The vehicle is fitted with an 8-horse power engine, with throttle control. The engine has two speeds forward and one back, and is of a very simple design, with atomizer connected. The special features of the engine are that there is no countershaft in the transmission of the power and no gears in motion when the carriage is stationary or running at high speed, the high speed driver being coupled direct to the engine, giving a direct pull. The rear drivers are 4 inches and the front 3 inches. The gasoline tank is directly under the platform and easily accessible. The wheels are fitted with Grant roller bearings. The entire vehicle weighs 1,400 pounds. In appearance it is very neat.

The Hewitt-Lindstrom Stanhope.

In the accompanying illustration, Figure 2, is shown an electric stanhope, manufactured by the Hewitt-Lindstrom Motor Co. of Chicago. A special feature of this vehicle is its large storage capacity, thus enabling it to run long distances. In its construction the manufacturer has aimed to maintain perfect alignment between the forward and rear axles, and at the same time construct the running gear so that it will adapt itself to the inequalities of the surface over which the wheels run.

To overcome shocks, the front and rear axles are connected to two bars or reaches, each of which is so connected that the rear axle has to swing vertically about the rocking point, while its connection with the fore wheel is practically a universal joint. This simple construction permits the wheels to move over very large obstacles.

The motor is suspended in the running gear in order to reduce the shocks and jars incident to the motion of the wheels over the surface of the road, and at the same time preserve the proper relation of the motor pinion and the counter gear.

The Barrett Steam Delivery Wagon.

In Figure 3 is shown a new steam delivery wagon built by S. H. Barrett, of Springfield, Mass. One of the main features, as will be noticed, is the vestibule with door directly in front. It has only one step to enter. The door has a glass window in a frame which can be closed by raising up, and thus protect the driver in bad weather. A condenser is used, which, it is claimed, prevents all escape of steam. The water is used over and over, and it is claimed that one filling of the water tank will run 100 miles or more. The boiler is tubular, with an automatic fuel controller, which closes at any point it is set and opens at 5 pounds below. It can be left any length of time and still maintain the full pressure of steam. The entire mechanism is below the body of the vehicle, thus admitting of the use of any style or type of body desired.

The Columbia Wagonette.

The wagonette shown in Fig. 4 was built by the Electric Vehicle Company, New York. Vehicles of this type are now in operation by the local transportation companies in New York, Boston and Chicago. The motive power is electricity, and the vehicle has a capacity of 25 miles on one charge of battery at a maximum speed of 10 miles an hour. Its carrying capacity is eleven passengers and driver. The tires are two and a half inches solid rubber and the wheels are of wood, the front wheels being 36 inches in diameter, the rear wheels 42 inches. The finish and general appearance are of the handsomest throughout.

The Strathmore Steam Surrey.

A new design of double seated carriage has just been completed by The Strathmore Automobile Company, of Boston, Mass. It is shown in Figure 5. It is driven by a six-horse power steam motor. The total weight is 1,400 pounds. It is intended primarily for park or boulevard use, but it is constructed with reference to securing the greatest possible strength and at the same time have great flexibility of frame, so that it can be used for touring over all kinds of roads. As will be noticed, the rear seat is somewhat elevated above the front seat, and thus giving an advantage to its occupants. Its makers consider the carriage both commodious and handsome.

The Riker Mail Wagon.

The illustration shows the new mail collection wagon just turned out by the Riker Motor Vehicle Company, Elizabethport, New Jersey. The vehicle is designed especially to meet all the requirements of the service. In its construction and arrangement it is claimed to be the most convenient yet introduced for this work. The distance which may be traveled on one charge is 25 miles and the speed 12 miles an hour. The carrying capacity is 200 pounds in addition to the operator. Forty cells of 50 ampere hours' capacity are required for its operation. It has a double motor equipment. The weight of the vehicle complete is 1,800 pounds. Two of these wagons are in successful service in Washington, D. C.

FIG. 7.—THE DURYEA PHAETON.

The Duryea Phaeton.

The phaeton illustrated in Fig. 7 is one of the latest products of the Duryea Power Co., Reading, Pa. In this machine the makers have endeavored to produce the best vehicle possible, combined with great speed and hill climbing ability. Its weight is 650 pounds and it has 3-in. tires, 30-in. and 36-in. wheels, with 1¼ inch spokes. A large axle extends through both rear wheels. It has a heavy driving chain of self-oiling pattern and powerful foot brake, which acts with sufficient force to slide the wheels in either direction.

The steering is effected by a single lever pivoted to the front edge of the seat. The motor throttle and clutch shifters are operated by the same handle, which, being located between the two riders, may be handled by either at will.

One turn of the starting crank produces a spark from the dynamo. The bearings are self-oiling except the motor pistons, which have large oil cups. The machine is strongly built throughout and carries a fuel supply sufficient to run 100 miles and is capable of a speed of 50 miles. It is claimed to be odorless and practically free from vibration.

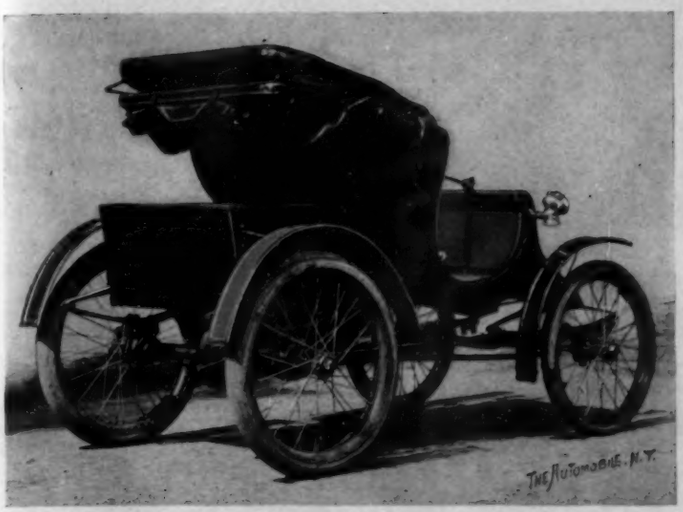


FIG. 1.—STEARNS STANHOPE.

FIG. 2.—HEWITT-LINDSTROM STANHOPE.

FIG. 3.—BARRETT STEAM DELIVERY WAGON.

FIG 4.—COLUMBIA WAGONETTE.

FIG. 5.—STRATHMORE STEAM SURREY.

FIG. 6.—RIKER MAIL WAGON.

NEW STYLES OF AUTOMOBILES.

The Gasoline Vehicle Engine.*—II.

By E. W. Roberts, M. E.

Next in importance to a thorough understanding of the principles involved in the gas-engine cycle is a thorough knowledge of the various methods employed in mixing the gasoline with the ingoing air. The classification of these methods which has to the writer appeared most reasonable is to divide them into three classes, as follows:

I. Carbureters, which may be defined as devices by means of which gasoline vapor is drawn from the body of the liquid by evaporation. These may be further divided into filtering and surface carbureters. In the filtering carbureter the air is passed through the body of the liquid, bubbling

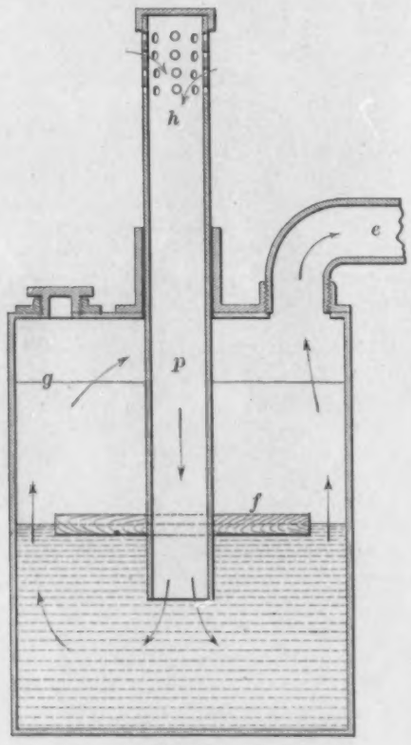


Fig. 3

through the mass, and each bubble of air taking with it a certain amount of gasoline in the form of vapor. In a surface carbureter the air, as the name implies, is passed over the surface of the liquid, the surface being quite frequently extended by means of wicking. The evaporation in a surface carbureter, and also quite frequently in a filtering carbureter, is accelerated by heating either the gasoline or the air, and sometimes both.

II. Vaporizers, in which there is transformed into vapor just the exact quantity of gasoline required for one charge of air. The principle upon which they operate is generally by drawing the air past an opening which communicates with a small reservoir of gasoline, wherein the fuel is preferably kept at a constant height. In some forms of vaporizers a small quantity of the fuel is allowed to flow directly into the path of the entering air, and is carried with the air upon the suction stroke. The main difference between the vaporizer and the carbureter is that a carbureter has a quantity of vapor always on hand, while a

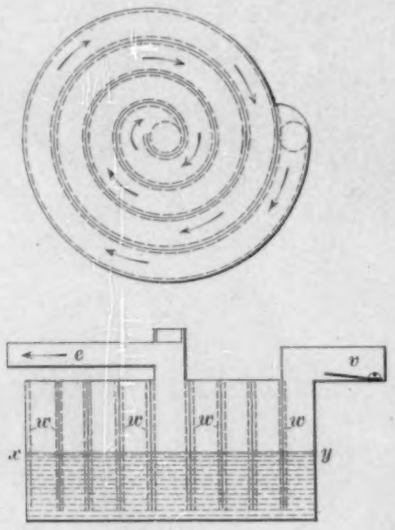


Fig. 4

vaporizer changes the gasoline into vapor only as it is needed.

III. Jets, as the name implies, are small streams of the liquid fuel thrown into the air pipe and against the side or against a special plate, with sufficient force to atomize the fuel. The jet is quite frequently classed as a vaporizer, but as its action is quite different in a great many respects, it should be considered separately.

The principle of operation of a filtering carbureter is illustrated in Fig. 3. In the figure the liquid is contained in the reservoir, and upon it floats a buoyant block f, carrying a pipe p, through which the air enters by way of the hole near the top. As the liquid is used, the float f descends, carrying with it the pipe and keeping the lower end at a constant distance below the surface of the liquid. The air passes through the liquid as shown by the arrows and upward through the gauze g to the engine through the pipe e.

A well-known form of surface carbureter, and one which the writer understands has been very successful in practice, is illustrated in Fig. 4. It is nothing more nor less than a reservoir containing a spiral partition dipping into the liquid, and having the wicking ww sewn on either side of the partition walls. The air is drawn through the clack valve v, and passes out around the spiral over the large surface presented by the wicking, and thence to the engine by the pipe e.

In Figs. 5, 6 and 7 are illustrated three of the most common forms of vaporizers, all of which are employed on motor vehicles, and, as far as the writer knows, are giving good results. In Fig. 5 is shown a form of vaporizer employed upon a French vehicle engine, in which the air draws with it a stream of gasoline upon the atomizer principle, the end of the gasoline pipe being at all times above the surface of the liquid in the auxiliary reservoir. Gasoline flows from the main reservoir through the pipe a into the auxiliary reservoir m, in which the surface of the liquid is kept at a constant height by means of the float c, which controls the opening of the valve v. Air passes from the atmosphere to the opening s by the nozzle g and through the engine through the pipe j. A deflecting cone is placed in the path of the gasoline and air for the supposed reason that it aids in mixing the fuel and air. It is of somewhat doubtful utility, however, as the writer knows quite a number of American engines working on this principle very successfully and without the cone h.

In Fig. 6 is shown a very successful form of vaporizer, of which there are several varieties in use. This vaporizer gasoline flows from an auxiliary reservoir past the needle valve f through the opening k and into the seat of the valve e. The air enters the vaporizer at c in the direction of the arrow, carrying with it the requisite amount of gasoline as it goes by the opening k. This device may also be employed

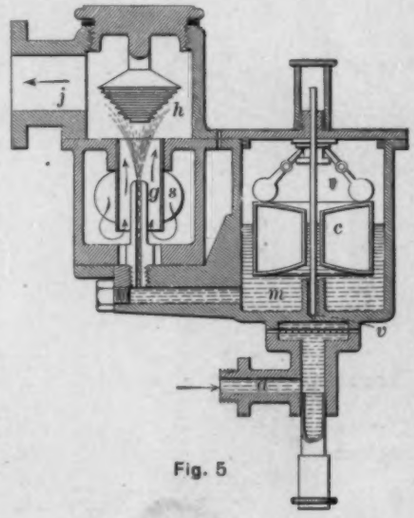


Fig. 5

for drawing the fuel to a point above its level in the auxiliary reservoir. The mixed gas and air passes to the engine through the opening d.

In Fig. 7 is shown still another form of vaporizer. It is somewhat similar to those already described, but in this case the valve a is a double seated one, the seat b closing the opening of the gasoline nozzle.

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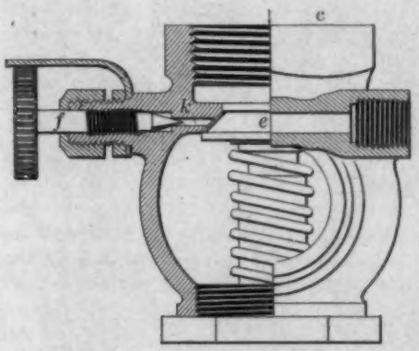
As the air passes through in the direction of the arrows it lifts the air valve a and consequently the valve b opening the gasoline supply pipe, from which the fuel flows by gravity into the chamber m and mixes with the air as it passes over the liquid.



SECTION ON *a-b*

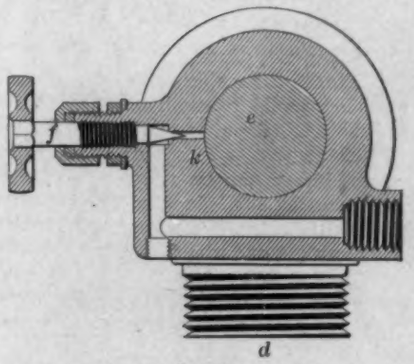


Fig. 6

The engine may be governed by controling the stroke of the valve with the stop s.

The jet needs little more description than that already given, and as, in the writer's knowledge, it has not proven a success on motor vehicle engines, no detailed description will be given. In the next issue the inherent difficulties of the carbureter and the vaporizer will be taken up in detail, their advantages and disadvantages shown, and the methods of overcoming the various troubles described.

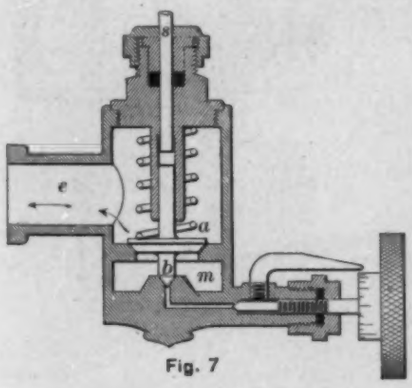


Fig. 7

Automobile Steering.

The steering mechanism is a vital portion of a carriage, as you must fully recognize. The methods at present adopted may be divided under four heads:

1. The system of lever bars.

2. The system of lever bars actuated by means of a rotary motion with an intermediate chain.

3. By levers actuated by rackwork or cog-wheels.

4. Levers actuated by worm-wheel and endless screw motion.

This latter is the one now adopted by the majority of Messrs. Panhard and Levassor's carriages. No. 2 system is that adopted on the cars of Messrs. Peugeot. Speaking for myself, I prefer Messrs. Peugeot's system. There is less vibration, and guiding is far easier. Against this system it is contended that impediments on the road react on the handle-bar, and give shocks to the driver. Also that there is a risk of the wheels being moved from their course by the obstructions, unless the handle-bar is held fairly tightly, but I can most positively assert that these objections are purely imaginary. In the early days, when less attention was given to details, there was some truth in the allegation, because the pivot on which the wheels turn did not plumb with the tread of the wheel on the ground. This is a most important point, and if the steering wheels are dished so that the points which touch the road plumb with the pivots, there is no tendency whatever for the wheels to be shifted by impediments on the highway.

A gentleman mentioned to me that he was riding a Peugeot car when the driver hit the curbstone, causing the handle-bar to be sharply turned. This, of course, would naturally happen, but then it must be remembered that, had the steering been on the endless screw principle, the chances are that the wheel would have been injured or smashed. I have driven carriages which have been steered with other methods, and in all cases I find that there was disagreeable vibration on the handles which rendered steering tiring after a time. With the endless screw this vibration is not noticeable until after the carriage has been in use a short time. Then it makes itself apparent in consequence of the wear and tear.

I am ready to admit that for racing purposes the endless screw is the best system, as the course can be altered very slowly by this means, so that a less experienced driver can race more safely. Anyone who has driven carriages with the various steering types mentioned discovers almost at once the extraordinary ease with which it is possible to wind in and out of traffic, however dense, with the system adopted on Messrs. Peugeot's vehicles, viz., intermediate chain system.—Sir David Salomon.

Some Safe Rules.

Keep to the right.

Follow the rules of the road.

Slow down when making a turn.

Light your lamps one hour after sunset.

Lock the levers when leaving your automobile.

Keep within an eight-mile speed when in city limits.

Pass to the left vehicles going in the same direction.

Have the automobile under control on going down hill.

Have your bell in good order, and a light tap is sufficient when passing crossings, or overtaking teams.

From Boston to Newport on One Charge of a Battery.

It is generally conceded that the storage battery automobile is the ideal self-propelled vehicle for city service or for any service where the mileage required does not exceed the capacity of one charge of the battery. In view of this fact it is interesting to note that one of the carriages made by the Electric Vehicle Co. of Hartford, Conn., was recently run on one charge of the battery from Boston to Newport over roads which made the distance 72½ miles. The total time consumed, including stops, was five hours and eighteen minutes, and the average speed was over fourteen miles per hour. The vehicle used was not designed for speed, and it was not attempted to make it. This run, however, with the other long runs recently made by electric vehicles, certainly indicates that the storage battery carriage is not only an ideal automobile from the point of view of simplicity and convenience, but it is also being rapidly developed into a vehicle which can be used for any ordinary touring, or for runs of under one hundred miles on a single charge of the batteries.

Speed Limit at Newport.

The Newport city council has passed an ordinance prohibiting automobiles running faster than six miles an hour in the center of the city, and in the less thickly settled portions ten miles. The penalty attached is twenty dollars or ten days imprisonment or both. Bicycles are also included in the act.

Automobile for Invoice Transfer Service.

The United States Government recently put into service a delivery wagon, manufactured by The "Locomobile" Company of America. The "locodelivery," as the vehicle is called, is used to transfer invoices in New York City from the custom house to public stores. Eight trips are made daily. In construction this vehicle is similar to the "locopost," which, it is claimed, holds the record in the collection of the United States mail, Washington, D. C., and Brooklyn, N. Y.

The Automobile

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CONTENTS.

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The Bridgeport Automobile Parade 130
The Industry in Germany 130
Experimental Trip of Major Davidson's War Carriage 130
The International Automobile Congress..... 130
The Gender of the Automobile 130
The Lightest Automobile. By Prof. R. H. Thurston 131
When Starting Out 131
New Styles of Automobiles 132, 133
The Stearns Stanhope.
Hewitt-Lindstrom Stanhope.
Barrett Steam Delivery Wagon.
Columbia Wagonette.
The Strathmore Steam Surry.
The Riker Mail Wagon.
Duryea Phaeton.
The Gasoline Vehicle Engine—II. By E. W. Roberts, M.E. 134, 135
Automobile Steering 135
Some Safe Rules 135
From Boston to Newport on One Charge of Battery. 135
Speed Limit at Newport..... 135
Automobile for Invoice Transfer Service.... 135
Editorials 136, 137
Importance of Knowledge and Care.
The Growth of the Industry.
Favoring the Automobile.
The Good Roads Congress.
Automobiles in the Park.
Our Correspondence Column.
Presence of Mind.
The Selden Gasoline Automobile Patent.... 137
Notes 137
Some Gasoline Troubles. By George T. Hanchett 138
Good Roads: The First International Good Roads Congress 138
Club News and Views 139
A New Club Organized.
Buffalo Automobile Club.
Making a Record.
The Buffalo Club's First Run.
The Automobile Club of America.
Madison Square Garden Exhibition..... 139
Grand Central Palace Show 139
The "Inter-Ocean" Automobile Exhibition.. 140
The Interstate Fair, Trenton, N. J..... 140
Correspondence 140, 141
The Marsh Motor Cycle.....141, 142
The Holley Motor Bicycle..... 142
Personal 143
Trade News 143
Patents 144
New Books 144
Advertisements.....141, 142, 143, 144, 145, 146, 147, 148

Importance of Knowledge and Care.

A careful study of the cause of many of the accidents which have been so frequent of late have led us to the conclusion that too many inexperienced and reckless hands are still grasping the levers of automobiles. Our advice briefly to novices who endanger their lives and those of others is that it would be cheaper for them to pay an experienced teacher than to pay for the damage done to their vehicles, fines and doctors' fees. We should also advise the users of automobiles to carefully study the rules of the road and observe them. Acquaint yourself with the ordinances governing horseless vehicles. Keep your eyes to the front so that you may see where you are going. Make haste slowly. Inspect your vehicle carefully before you start out. Respect the rights of others. Have an audible signal on your vehicle. And, last but not least in importance, know the construction of every detail of your vehicle, and learn to manipulate it properly. Failure to comply with the last-named condition is no doubt responsible for the majority of accidents and gives us an excellent opportunity to practice what we preach. We shall endeavor, by the publication of practical articles on the construction and proper handling and care of vehicles and their parts, to assist in the education of automobilists, for we consider that one of our most important missions. Such articles appear in this number, and will be continued in succeeding issues by Messrs. E. W. Roberts and Geo. T. Hanchett and other authorities. In regard to a signaling device, we would suggest the adoption of a bell or horn, the sound of which is characteristio and can be heard above the other noises to which we have become accustomed. The remedies, then, against accidents and consequent arrest lie largely in our own hands, and the sooner we apply them the sooner will the user of the automobile dodge danger and abuse and the daily editor be compelled to hunt for sensational articles of a different nature.

The Growth of the Industry.

To anyone who has closely watched the growth of the automobile industry it is most encouraging to observe how its sphere of usefulness is extending and how its importance is being more and more universally recognized. From a mere pleasure vehicle it has developed into a factor in the industrial world and has not alone become the servant of the people but in many instances their benefactor as well. It has created new industries and enriched the old, thereby opening up new avenues for employment of thousands of people. It has put into circulation vast sums of money, become an important factor in the movement in favor of good roads, will by the removal of stables and horses improve the sanitary condition of cities, and in this way, and by being at the service of physicians and firemen, save countless lives. The time is rapidly approaching when prejudice will be conquered by the spread of truth, and the automobile is already being ranked among one of the greatest blessings to mankind. It was this which must have inspired the artist who painted one of the panels for the Festival Hall at the Paris Exposition representing electrical progress to include the automobile among the other epoch-making discoveries, the dynamo, the telegraph, the telephone and the electric light. And it is no doubt this same thought which induced our own government to adorn one of the new stamps to be issued in commemoration of the Pan-American Exposition with a picture of an automobile. We may admit that the automobile industry is in its infancy, but it certainly is a mighty healthy infant.

Favoring the Automobile.

The bicycle rider soon finds that over mud, sand or rough roads it takes more power to propel his wheel than it would take if the road were smooth and level. He quickly becomes an expert in winding a devious way through the obstacles and hindrances. In this respect the automobilist should imitate him. The owner of an electric vehicle is particularly favored in this respect, as by means of his instruments before him he can, after some experience, tell at all times how much power he is using. He will soon find that even if he can get one wheel on a smooth, hard spot he can save a great deal of power and wear and tear on the machinery. Gasoline and steam users must take the above for granted and learn by practice in what manner and under what conditions they can save fuel. Rough roads, mud and sand are as hard on the automobile as they are on the horse. It is never well to get an idea that because the automobile is powerful and will travel over rough roads that it is not using any more power than it would traveling over smooth ones. An engineer favors his locomotive in order to get the best results, and the opportunities of favoring an automobile are far greater if proper attention be paid to this point.

The Good Roads Congress.

"We are here for action, not for words," as one of the delegates remarked, was the spirit which marked the proceedings of that handful of good roads missionaries who met recently at Port Huron, Mich. They preached, in the words of one of their number, good roads from a business and practical standpoint, and it is to be hoped that their conscientious labors will bear ample fruit and that the addresses and resolutions will stimulate their coworkers and the national government to a more vigorous campaign for the betterment of our common highways. From a narrow, single-handed fight for better roads, the many-sided necessity for their improvement has developed it into an international movement. A new impetus has recently been given to the movement

by one of the national political parties, which has seen fit to include a good roads plank in its platform, and the government's agricultural department is arduously continuing its experiments and work of instruction by the publication of valuable good roads literature. In the words of Col. W. H. Moore, the four elements necessary are organization, education, agitation and legislation. The first of these was represented by the Congress itself, which showed its force by the passing of powerful resolutions. It also exemplified the educational feature, which should be carried further by the various state organizations and the national government. Agitation is needed in furthering the progress of any good movement, and should not be lost sight of; and finally legislation is the natural outcome of the first three essentials, for as the people organize, educate their representatives and agitate a good cause so will our legislators act and make provisions for the things the people need.

Automobiles in the Park.

Not allow automobiles in public parks? Why not keep horses out? Neither brains, muscle nor skill are proof against the destruction wrought by a frightened horse. A fluttering bird, the picturesque attire of an innocent child, the flash of a passing wheel, the fall of a leaf or a hopping squirrel will frighten the timid and high-strung beast. The automobile, however, is fright proof and the willing servant of brains alone. Sooner or later this must be recognized by conservative city fathers, and the horseless vehicle be admitted to every public park.

Our Correspondence Column.

If anyone would attempt to discover the cause of the unprecedented and well nigh incredible rapidity with which the automobile industry has developed he would find that it is largely due to the fact that every detail of the subject has been popularized by the technical and daily press, and that the very best talents of every allied industry took part in its development. Groundless conservatism and petty jealousy have been foreign elements from the beginning, and could not therefore exert their retarding influences. Furthermore, there seems to be a common desire on the part of all earnest workers in the field to aid in the production of the most serviceable and most efficient vehicle, and to arrive at truths by an interchange of thought. It is this desire on the part of the designer as well as the builder, the salesman as well as the buyer, which is so rapidly elevating the plane of the industry and will soon develop an esprit de corps among the lovers of the automobile. To encourage this feature, our columns are always open for the discussion of any topic which has a bearing on any branch of the industry, and we feel that we can point with pride to the letters on the important question of side slip of motor cycles which appear in our correspondence column this month. We wish to take this opportunity to thank our correspondents for aiding us in this educational movement, which we are certain will be helpful and interesting to a great majority of our readers. We invite all who have questions to ask or opinions to express to use our columns freely for such purpose.

Presence of Mind.

The automobilist always should have presence of mind. This is strikingly illustrated by the example of Baron Eugen von Dietrich, who while recently trying a racing machine near Worth, in descending a very steep hill had the brake mechanism fail suddenly, so that he and his companions were in an exceedingly dangerous position. In an instant, however, he steered the vehicle sideways off the road and ran up the bordering embankment. The vehicle then turned a somersault, but no one was hurt.

The Selden Gasoline Automobile Patent.

The Electric Vehicle Co. owns the U. S. Patent No. 549,160 issued to Geo. B. Selden, November 5, 1895, the application for the same having been made May 9, 1879. Mr. Selden disposed of his patent to the Columbia and Electric Vehicle Co., which has since been absorbed by the Electric Vehicle Co.

It is claimed that this patent covers broadly the application of explosive motors to automobiles, and suit has been brought by the Electric Vehicle Co., New York, against the Winton Motor Carriage Co., Cleveland, and the Buffalo Gasoline Motor Co., Buffalo, to restrain them from making or selling automobiles operated by gas engines. It is stated by an official of the Electric Vehicle Co. that the suit is brought for the purpose of testing the validity of the patent, the position of the company being that they had, after careful investigation, reached the conclusion that the patent was a basic one so far as the gasoline vehicle is concerned, and consequently it was decided to purchase it. It is a matter, however, this official says, for the courts to settle, as the company proposes to defend its rights and will therefore become the aggressor.

A meeting of the other leading manufacturers of gasoline vehicles is to be held in Buffalo, August 2, at which meeting it is proposed to organize a defensive association.

It is to be hoped that the matter will be brought to a speedy issue because of its vital importance to the development and progress of the gasoline automobile, as well as the good of the industry in general. However, unless some compromise is effected, a determined and consequently lengthy fight may naturally be looked for because of the importance of the companies engaged in the controversy and the far reaching effects of a final decision.

Notes.

Permission has been granted by Commissioner Clausen for the operation of four electric automobiles for public service in the parks of New York. The carriages will be under the supervision of the director of the park carriage service, and the number will no doubt be increased very soon.

Two men from Los Angeles, California, according to the San Francisco Chronicle, ran a distance of 70 miles from Raymond to the Valley, by way of Wawona. The entire distance was covered in eight hours and eighteen minutes, and with the total consumption of eight gallons of gasoline. The automobile was driven by steam. Two days are required to make the trip in the regular stages.

An automobile exposition and tournament, the first of the kind in this country, was held July 25 and 26 at the driving park at Brantford, Conn. The program was a very interesting one, and some exciting races were had although the rain interfered to some extent. The prizes offered were for all classes of vehicles, including the lightest motor cycles to the heaviest automobiles made.

It was recently decided by United States supervising inspector, General Dumont, in the Jamestown, R. I., Ferry case, that vehicles using gasoline directly or indirectly came under section 4472 of the United States Revised Statutes forbidding the carrying of combustibles on steam or ferry boats run on navigable bodies of water. This ruling, if enforced, would of course prevent a gasoline or steam vehicle using gasoline for fuel from crossing a ferry. The law committee, however, of the Automobile Club of America has taken the matter in hand and claims that this would be an unjust discrimination, as kerosene or nitro-glycerine even, can be carried when properly protected. Mr. Geo. F. Chamberlin, of the committee, is now in correspondence with General Dumont, and satisfactory regulations no doubt will be adopted.

An interesting automobile fete in the form of a gymkana took place on the cycling grounds, near London, on Saturday, July 28, under the auspices of the Sheen House Club.

One of the most exciting events was a race between motor vehicles, which were all in a cold condition when the signal was given. The driver had to start on foot, twenty yards in the rear of the vehicle, run to it, light the lamps, start the engine and run up a straight course, with a flying finish. This was won by Capt. Longlish, who drove a 6-h.p. Pengeat.

The motor coat and waistcoat race also afforded much amusement. This was won by Hon. C. S. Rolls. There were also races for the ladies, obstacle races and a starting and stopping handicap.

Some Gasoline Troubles.

By George T. Hanchett.

The gasoline vehicle frequently falls into the hands of those who are unacquainted with electrical matters, and to such persons the ignitor frequently gives serious trouble, serious because the novice is at a loss to remedy the same. It is, to say the least, quite annoying for the automobilist who has just paid a substantial consideration to some exultant farmer for horse-hauling his vehicle to the shop of one who knows, to have that worthy run his fingers over the vehicle, tighten a screw, and then to start off as though nothing had happened.

The writer has seen this situation materialize more than once, and therefore ventures to offer the following rules, which, though highly elementary, are invaluable to those who don't know them.

A sparking device fails through one of three causes: Open circuit, short circuit, or dead battery.

An open circuit is a discontinuity in the electric circuit. It may be due to

(a) A broken wire,
(b) A loose screw,
(c) A bad joint. All joints should be tight metal to metal contacts.
(d) Contact on the engine failing to touch.

Broken wires are quite deceptive at times. They may appear continuous while being merely held together by the outside wrapping. Similarly a defective joint will not disclose its nature till stripped and examined. A well soldered joint removes much uncertainty.

Loose screws are the most frequent troubles, as the jar of the vehicle invites them. The wires connecting the batteries together are just as important as those leading from the cells.

The first thing to do in case of a balky ignitor is to see that all the screws are tight. Next examine all the moving contacts and make sure that they are operative. After these are found secure broken wires or bad joints may be sought.

A short circuit is a spurious path for the current other than through the engine contacts. It deflects so much current from them that they fail to operate. For instance, suppose the two wires leading to the contacts become bared and crossed before they arrive there. It is unlikely in that case that any current worth mentioning would appear at the contacts. A similar result would obtain if both wires were bared and pressed against the iron work of the frame. In many vehicles one wire is permanently attached to the frame, and the operation of the device depends solely on the insulation of the other. To avoid short circuits keep the wires insulated from the frame and from each other. In hunting short circuits suspect every spot where the insulation appears defective.

Dead batteries obviously cannot give current for sparking purposes. Short circuits and long usage are mainly responsible for dead cells.

Always stop the engine by opening the battery circuit. Then shut off the gasoline supply. By this means you avoid the evil effects which obtain by the stopping of the engine in a position in which the battery circuit is closed, a condition which is nearly if not quite equivalent to a short circuit as far as running down the battery is concerned.

The water circulation is another thing that should receive attention. If it is not operative the automobilist must not be surprised if his engine slows down, and on examination is found to be "frozen," to use a rather inverse term, the pistons being firmly baked in a mass of carbonized lubricating oil. Pistons are like bearings, they must be kept cool and well lubricated or they will give trouble.

Good Roads

The First International Good Roads Congress.

It was a thoroughly representative and enthusiastic gathering which met at Port Huron, Mich., on July 2, to attend the first International Good Roads Congress. Men interested in this progressive movement came from every section of the country to witness the building of a model macadam road in accordance with suggestions made by the U. S. Government and to listen to addresses and papers by experts and builders.

Mr. E. G. Harrison, the government expert, introduced by H. S. Earle, chief consul of the L. A. W., for Michigan, spoke of the co-operation of the U. S. Government and the free distribution of its "Good Roads" literature. What they are doing in Michigan, he said, is to "put a roof on the road to keep the water away," and he pointed out the similarity between the building of a road and that of a tall building, especially in regard to the foundation. In his opinion there ought to be four inches of foundation and three inches of dressing. A road can be made watertight with six inches. He had also drawn up a bill which provides that anyone who changes the width of tires from two to four inches can have a rebate on township taxes. A nine-foot road can be built for about $2,500 to $2,800 per mile, but good roads have been built costing as low as $1,100 per mile.

The delegates then went to the plant of the Port Huron Engine & Thresher Co., where they inspected a new steam plow and wagon loader.

On the following day an address was made by Director Martin Dodge, of the Roads Bureau of Washington, in the course of which he said: "The solution of the good roads problem requires mechanical skill, together with the wisdom of statesmanship. It seems to me that to raise money for good roads a new system of taxation should be adopted."

He was followed by Mr. A. E. Palmer, of Kalkasha, Mich., who chose "The Farmer" as his subject, so as to bring out more forcibly the farmer's views on the good roads problem. A few remarks were then made by Andrew Patula, M. P., from Canada: "It is humiliating to Canadians and Americans," said this speaker, "that while making progress in everything else we are just now emerging from a semi-barbaric state in regard to good roads."

A most vital phase of the question, namely, that good roads mean good health, was discussed in the afternoon by E. S. Smith, M. D., of Detroit. He said in part: "Stage drivers after riding over rough roads for a number of years come down with a certain disease which generally affects the stomach and is deathly in its nature. I think that the poor, worn-out appearance of many of our country folk is the result of riding over rough roads. The jar to the nervous system affects the entire body, and the result is injurious."

Further remarks were made by A. W. Campbell, provincial road commissioner of Toronto, and Col. W. H. Moore, of St. Louis, Mo., who aptly said: "The four elements necessary are organization, education, agitation and legislation." Mr. H. S. Earle mentioned the fact that he had sent out 19,000 pieces of literature for this event, and the benefits of the meeting will be heard all over the United States.

Prof. J. D. Towar, of the agricultural college, advocated the cultivation of shrubbery and flowers along the roadway so as to beautify the same, claiming that the roadside should not be used as a storage place for farm implements.

Other addresses were made by Prof. Clinton D. Smith, of the agricultural college; Richard Stone, representing the commercial clubs, of Topeka, Kansas, and Arthur Kirk, of Pittsburg, Pa.

During the final session on Wednesday steps were taken towards the formation of a National or International Good Roads Association. The following committee were appointed to confer on this subject with the various state organizations: Hon. Martin Dodge, Andrew Pattula and Col. Carl Moore.

Resolutions were then adopted which urge upon the U. S. Government the necessity for providing good roads for overland transportation so that the cost of the latter might be reduced. The work of the U. S. Dept. of Agriculture is highly commended, as is also the formation of good roads associations throughout the States. They further recommend the employment of convict labor for the construction of highways and the preparation of road material. A vote of appreciation was then extended to Chief Consul Earle for his efforts in bringing the Congress together.

Club News and Views.

Club Directory.

Automobile Club of America, Homer W. Hedge, Secy., 120 Broadway, New York; representative to Paris Congress, A. C. Bostwick; representative on International Racing Board, Clarence Grey Dinsmore; substitute, John H. Flagler.

Automobile Club of Baltimore, W. W. Donaldson, Secy., 872 Park Ave., Baltimore.

Automobile Club of Chicago, Andrew R. Sheriff, Secy., Calumet Club, Michigan Ave., Chicago.

Automobile Club of Columbus, C. M. Chittenden, Secy., Broad St., Columbus, O.

Automobile Club of Rochester, Fredk. Sager, Secy., 66 East Ave., Rochester, N. Y.

Buffalo Automobile Club, Geo. S. Metcalf, Secy., Buffalo, N. Y.

Cleveland Automobile Club, L. H. Rogers, Secy., Cleveland, O.

Columbia College Automobile Club, Lewis Iselin, Secy., Col. College, New York.

North Jersey Automobile Club, E. T. Bell, Jr., Secy., Paterson, N. J.

Philadelphia Automobile Club, Frank C. Lewin, Secy., Hotel Flanders, Phila., Pa.

San Francisco Automobile Club, B. L. Ryder, Secy., San Francisco, Cal.

A New Club Organized.

On July 21st a number of prominent automobilists met at the residence of Howard Willetts, White Plains, N. Y., for the purpose of forming an automobile club. Among the charter members are Howard Willetts, William K. Vanderbilt, Jr., Wm. Rockefeller, Jr., Wm. E. Iselin, P. G. Thebaud, T. L. Park, Oliver Harriman, Jr., Eugene Reynal and Nathaniel Reynal.

It is stated that the club will work in close fellowship with the Automobile Club of America, and one of its objects will be to provide supply stations along the roads and boulevards through the Bronx and Hudson River valleys and the cross country roads to Ardsley Casino, Westchester Club and Knollwood Country Club.

Buffalo Automobile Club.

Buffalo's first automobile association perfected its organization at a meeting held at the Buffalo Club on the evening of July 2. It is known as the Buffalo Automobile Club. The officers, who were chosen to serve for the first year, are: Dr. V. Mott Pierce, president; Dr. Truman J. Martin, vice-president; George S. Metcalfe, secretary; Dr. Lee H. Smith, treasurer; D. W. Sowers, consulting engineer; Charles J. Shepard, J. T. Budd and Chas. R. Huntley, directors. The directors and the officers will form the board of governors.

Meetings will be held on the first Monday in each month, and the club will have an annual automobile parade. Thirty-four members have been enrolled. Automobilists living within 50 miles of Buffalo can become associate members. The initiation fee is $20 and the annual dues $10.

Making a Record.

Mr. William K. Vanderbilt, Jr., in his imported Panhard racer, recently ran from Newport to Boston and return in less than four hours, actual running time. The distance between the two cities is about 79 miles by road. The steam cars require about two hours' time, and the distance is some 10 miles less. The roads during a part of the distance were very poor, and there were a number of very heavy grades.

The Buffalo Club's First Run.

The first run of the Buffalo Automobile Club took place on Saturday, July 7. Seven automobiles took part in the excursion, which was pleasant and in every way successful, but all within the city limits. The second run, held on the Saturday following, far surpassed the first one, and was attended by a greater number of members. The route, which was 18 miles in length, included a number of suburbs, and the pleasure of the drive was much enhanced by the beauty of the scenery. The president, Dr. V. Mott Pierce, headed the line with his new electric break.

The Automobile Club of America.

While the majority of members are away on their summer vacations, the various committees and secretaries are busily engaged arranging the work for the coming season, which will, judging from the preliminary arrangements which are being made, be a very busy one for the club. The illustration herewith shows its official emblem recently adopted. In design the emblem is simple, yet neat and in thoroughly good taste. The club's year book is nearly completed and is a veritable compendium of automobile literature and events. It is a production of which the members may well feel proud, and will be a valuable addition to any automobilist's library. In this connection we might add that if any of our readers should become aware of any new charging stations they would confer a favor on the secretary by notifying him to that effect.

Madison Square Garden Exhibition.

The attention of our readers has already been called to the "Exhibition of Automobiles and Accessories" to be held at Madison Square Garden, New York, from November 3 to 10, 1900, under the auspices of the Automobile Club of America.

The club committee on this exhibition announces that all the floor space of the garden has been rented by intending exhibitors, and it is proposed to utilize some additional space by flooring over the boxes for the exhibition of accessories. It has also been deemed necessary to utilize the restaurant for exhibition purposes, and the concert hall will be used as a restaurant.

One of the features of the exhibition will be a circular track, on which automobiles of all kinds will be shown in motion, and it is proposed to utilize this track for the purposes of contests of various kinds, under the direction of the technical committee of the club in the several classes of automobiles exhibited.

Besides, Messrs. Vanderbilt, Bostwick and Bishop propose to bring over from Paris three or four modern French racing machines. These will be on exhibition in the restaurant, and will doubtless prove a very great attraction. The management has had a new diagram drawn showing location of spaces for accessories in the gallery, on the Twenty-seventh street side of the building, and applications have already been received from manufacturers.

The following gentlemen compose the exhibition committee: A. R. Shattuck, chairman, 11 Broadway; General George Moore Smith and E. E. Schwarzkopf. Communications or inquiries should be addressed to the chairman of the committee.

Grand Central Palace Show.

That a keen interest is being taken by the manufacturers in the automobile show to be held in the Grand Central Palace, New York, from November 14th to 24th, is indicated by the early applications for space. More than ten thousand feet of space has been signed up, and this, with the space selected but not yet signed for, will make fully half the available space disposed of almost four months before the exhibition.

Mr. Marcus Nathan, the general manager of this automobile show is doing much to stir up an interest that will extend far beyond the present users of automobiles, a fact that should, and no doubt will, mean much to exhibitors. The representative character of the exhibits, and their variety and completeness, are factors in creating a popular interest. With this in mind, the management made very low prices, abolished the usual extra charges, and made all the conditions easy. This is already apparent by the large advance sale of space to representative concerns.

The "Inter Ocean" Automobile Exhibition.

For some time past preparations have been going on for the automobile exhibition to be held at Washington Park, Chicago, from September 18 to 22, under the auspices of the Chicago "Inter-Ocean," which, on account of the great variety of events scheduled and the large purse offered for prizes, has already attracted considerable attention. The following is an abstract of the preliminary draft of the program:

On the opening day there will be a general parade of 500 vehicles. Prizes will be given to the manufacturer presenting the greatest number of practical designs, and, second, to the manufacturer having the greatest number of automobiles in line. A special prize for the most practical design of wagon for general purposes.

The second day will be the commencement of the tests for general practical utility. All different forms of power will be classed together, and vehicles of each different rating of power will be awarded honors and prizes in competition only with vehicles of like size.

In testing the practical manipulation of vehicles, a series of dummy figures will be introduced on the tracks, which shall be constantly shifted, some remaining permanent, as the vehicles pass through them.

There will be a hill climbing contest, also a contest on an incline and decline grade, in which practicability and controllability of vehicle will be demonstrated.

There will be a heavy draft contest, open for all heavy draft motor trucks built for commercial hauling.

Four races will be given as follows, in which speed alone will count for one hundred points: A race of twenty miles between steam vehicles; a race of twenty miles between electric vehicles; a race of twenty miles between gasoline vehicles.

The prize winners of each race to then enter into a free for all race of forty miles, standing start without aid—speed to count one hundred points.

Two hundred mile free for all fast track race, for owners, carrying four grown people. Also two hundred mile track race, carrying two people.

A very important feature of the exhibit will be a mail race. Four mail boxes will be placed at equi-distant points around the race track and ten miles will be run, making forty stops in all, to collect mail. Each driver will be obliged to stop at each mail box, unlock the box and take a card from same and lock again.

This will be followed by an automobile transfer express, which shall be run five miles, taking a swinging bag from suspended hooks at four points around the track without stopping. The man coming in first with twenty of these bags will be awarded first prize. This test will be open to any and all classes of vehicles.

Ladies' day will be full of interest, as ladies will have the tracks exclusively in a series of races which shall be run in regular carriages and not racing vehicles.

A special gold medal (engraved with the name of vehicle and operator) will be awarded the operator of vehicles (of the commercial and catalogue type) who performs the most difficult tests and practical movements.

To demonstrate the merchandise delivery wagon, a race of three miles will be run, having eight stations on alternate sides of the track, at each of which must be left a package weighing not less than twenty pounds.

After the races are over, a grand prize of a thousand dollars will be offered to the most valuable invention in automobiles that shall have been practically demonstrated during the week of the exhibition.

Among the novel features on daily exhibition: One passenger vehicle will be given an eighth of a mile start of a second vehicle. The latter overtaking the first, and a complete exchange made of baggage, drivers and passengers, with vehicles running at full speed.

To be immediately followed by a race of automobiles running backwards at full speed for one mile. The latter race to be open to any and all kinds of vehicles.

It is reported that space sold up to date gives a total of 500 machines on view on opening day. It is proposed to make such an absolute and practical demonstration of motor transportation as will satisfy the public as to the positive permanency and practicability of the industry. A brilliant system of electric lighting is to be arranged for night racing, and the grand stands have a capacity of 50,000 persons. Ten thousand dollars have been offered in prizes, and if the original plans of the promoters are carried out this event promises to be of international interest and importance. Mr. Dwight W. Bowles is the business manager of the company.

The Inter-State Fair, Trenton, N. J.

During the "Greater Inter-State Fair," which takes place at Trenton, N. J., an automobile exhibition and races will be held, beginning September 24 and ending September 28, 1900, under the direction of Mr. E. E. Schwarzkopf. No charge will be made for space allotted for exhibiting automobiles or their accessories. The allottment of spaces will be made on August 1st. Automobile races will be run on September 24 over the half-mile driving track, which is 66 feet wide.

The stewards of the meet, and the judges of vehicles and their accessories, will be constituted from members of the Automobile Club of America and the Automobile Club of Philadelphia, who will sign and present handsome diplomas to successful competitors.

All entries to be accompanied by entry fees, and to be addressed to M. R. Margerum, secretary, Inter-State Fair Association, Trenton, N. J. Entries will close September 1st (noon).

Correspondence.

Space will be given on this page to letters concerning the Automobile, its operation or construction, to accounts of tours or runs, routes of travel, good roads, etc. When requested by correspondents their names will not be published, but must always be given in the communication to the Editor.

Mounting of Grades.

Chicago, Ill., July 16.

Editor THE AUTOMOBILE:

I wish to get a machine capable of carrying six or nine passengers up moderately stiff grades. Do you consider that the gasoline machines will do this? What horse power should they have, and what make can you recommend? What is the formula for figuring the percentage of grades?

Yours truly,

W. H. TANNER.

Answers to Inquiries.

In reply to the question:

"Who built the first gasoline automobile in this country?" which appeared in the July number of THE AUTOMOBILE, the Haynes-Apperson Co., of Kokomo, Ind., write:

"We built our first complete gasoline automobile early in 1893. We believe we were as early in the field, if not the first, to enter it in this country. This carriage was immediately placed into active service and is still in use, practically the same as it was then as to form of construction."

Mr. Chas. E. Duryea, of the Duryea Power Co., Reading, Pa., writes as follows:

"The writer has been interested in rapid transit over common roads for twenty years or more, but did not find a suitable motor until 1885 or 1886, when he began to study the gasoline motor, electrically ignited. For the next five years considerable thought and experimenting were devoted to this subject as opportunity presented, and in the fall of 1891 it was decided that the public would be ready for such a vehicle by the time it could be produced, so actual work on the vehicle was begun. The first vehicle was finished in 1892, and consisted of a lady's phaeton of the ordinary type, having motor and driving mechanism applied to the running gear. Some experience with this indicated a number of changes, which were finished by 1893. After considerable use of this vehicle another was designed, having more power and departing from the conventional horse vehicle to some extent. This machine was really never finished, because certain faults developed in the design, and the next machine was finished in the spring of 1895. This machine was used on the streets at Springfield, Mass., nearly every day throughout the spring and summer, and won the Chicago Times-Herald race on Thanksgiving Day, 1895. It was the only American gasoline vehicle to start in that contest, although some others were entered. The writer does not know of anyone in this country who built a successful gasoline machine previous to his own production."

In reply to the question as to:

"*The danger of side slip with motor bicycles on which the motor is mounted above the wheels,*" which appeared in the July number of THE AUTOMOBILE, Mr. C. J. Field, of the De Dion-Bouton Motorette Co., Brooklyn, N. Y., writes:

"The writer, when in England and France recently, made careful investigation of the motor question, and feels from the basis of experience abroad that the motor bicycle is not going to have the development here with the public or meet with the approval of the public that a number of the bicycle people say it will.

"The experience abroad is that the motor bicycle is a dangerous machine to operate on ordinary roads owing to side slipping, danger in negotiating curves, and of capsizing on striking a wet place in the road. The motor tricycles and quadricycles are the popular motor cycles abroad, and are ones which the public have found to give every satisfaction, safety, reliability and simplicity, and all the speed that can possibly be required under any circumstances.

"A quadricycle can be operated from 20 to 30 miles an hour and the tricycle from 30 to 40 miles per hour, or even better. Several went through the 1,000-mile tour in England this spring with success. They were operated with De Dion motors. This is a speed at which the machine could be operated on only the best of roads. The small difference in saving between the motor bicycle and motor tricycle is not much of an inducement when it is more than counterbalanced by the reasons above stated.

"In making this clear and frank statement we do it in the interests of the public and manufacturers, as we furnish motors for all types of motor cycles, and we feel that our first duty is to give the public the benefit of results and facts as we found them."

The Cycle and Tool Mfg. Co., Springfield, Mass., express their views as follows:

"We have never had sufficient faith in a motor bicycle in which the motor was mounted above the line of the wheel axles to experiment very largely with this class.

"To bicycle riders anticipating the purchase of a motor bicycle having the motor fitted to the steering wheel, we would simply suggest that they recall their experience with a package of, say, anywhere from 10 to 15 pounds strapped on the handle bar. We believe their recollection of this experience would preclude any possibility of their investing in the above mentioned class of motor cycle.

"While mounting a motor above the rear wheel would probably be preferable to mounting it above the front wheel, there is also a very strong objection, principally due to the fact of the height of the motor from the ground and to the unsightly appearance, to say nothing of the trouble in mounting and dismounting.

"We offer you the foregoing remarks for what they are worth, saying to you frankly that we are interested in the production of motor cycles in which the construction differs very materially from either of the above styles; therefore our opinions would perhaps be more or less prejudiced."

The Anthony Motor and Mfg. Co., Colorado Springs, Colo., write:

"We have experienced no discomfort or danger in riding the motor bicycle with motor mounted above the wheel. We mount our motors in this manner in preference to any other way if the motor is designed to be attached to any wheel. We find that the motor, mounted in this way, is a real aid to steadiness in steering. Of course care is necessary in swinging around corners upon slippery pavements, for the tendency to "skid" or "side slip" which is always present under such conditions, is aggravated by the weight and motion of the motor wherever placed."

(Lack of space prevents the publication of all replies received; others will appear in the September Number.—Ed.)

MARSH MOTOR CYCLE.

The Marsh Motor Cycle.

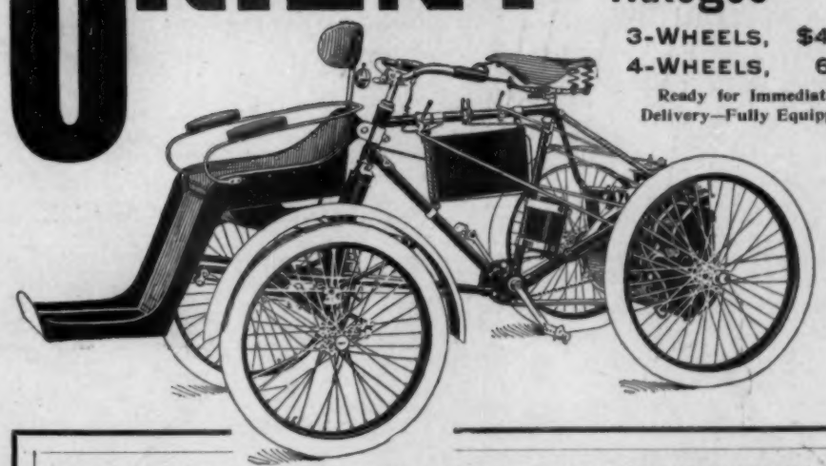
The growing popularity of motor cycles has set many inventors to work devising machines which, with a minimum weight, give a maximum of power as well as insure perfect safety, high speed and large capacity. Our illustration below shows such a machine, manufactured by Marsh Bros., Brockton, Mass., which has traveled over 1,000 miles, and has proved itself very reliable.

The machine weighs 60 pounds when ready for the road, and is fitted with a coaster brake hub, which has the releasing gear and brake on the right hand side and the 32-tooth sprocket, to which the motor is connected on the left. The cylindrical box A contains the spark coil, while the tube B on the top part of the frame contains the batteries, which are composed of 4 cells 1 1-16 x 1⅞ long placed lengthwise in the said tube. The fuel tank C, which holds a quart, is securely fastened to the back of the seat post by a suitable lug, as may be seen in the illustration. Directly below the fuel tank on the right hand side may be seen the carborator D, which is fastened to the seat mast tube by a suitable brace. On the seat mast tube between the motor base and the rear wheel may be seen the muffler E, which is 2 inches diameter by 7 inches long. The fixture F is an air scoop to carry warm air from the motor to the carborator. The seat mast to

ORIENT Autogos

3-WHEELS, $450
4-WHEELS, 600

Ready for Immediate Delivery—Fully Equipped



It is out of the question to fully describe, in this little space, the pleasure that comes to the owner of an Orient Autogo. It is sufficient that these machines do not bring a troublesome future, as the ASTER MOTOR is the perfected apparatus and the last of the little annoyances has been dissipated by its use. Write for the book and watch this space for monthly information about Orient Autogos.

WALTHAM MFG. CO., Waltham, Mass.

which the motor is fastened, and which acts as exhaust pipe between the motor and the muffler, is made of 10-gauge tubing, while all other parts are made of 16-gauge, which insures strength and freedom from breakage. The motor chain is adjusted by moving the rear wheel back in the parallel jaws in which it hangs, when the pedal chain is adjusted by a specially designed eccentric crank hanger.

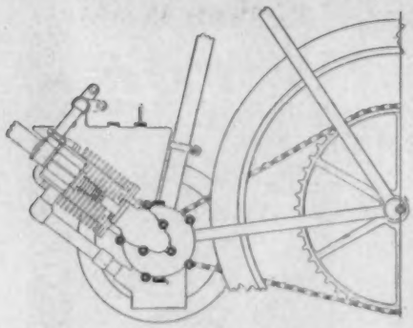
The motor G, which is of the "Autocycle" air cooled type, is 1⅞ inches (bore) by 2¼ inches stroke. The crank case is 7 inches diameter outside, and contains a pair of 6-inch balances ¾ inch wide.

The motor is geared so that it revolves 6 2-5 times to one turn of the rear wheel, and will carry a person of average weight from 20 to 25 miles an hour without any help from the feet except going up some of the very steepest hills, when a little help from the feet will carry you right up at top speed.

From the size of the motor it can be easily seen that the machine is not built for racing purposes, and the company considers it extremely dangerous to make the motor any larger for the use of the public, as it would surely result in some very serious accidents.

THE HOLLEY MOTOR BICYCLE.

The accompanying cut illustrates the design and mounting of the motor on a motor bicycle recently perfected by Geo. M. Holley of Bradford, Pa. The motor is of 1¾ horse power, four cycle type and air cooled. It will give a speed ranging



THE HOLLEY MOTOR BICYCLE

from four to twenty-five miles per hour. A gallon of gasoline is said to be good for sixty miles. On trial it is said to have taken a rider up a sixteen per cent grade at a rate of eight miles per hour. It is very compact and is applied at the strongest and most effective point on the wheel.

SPECIAL NOTICES.

Cards "Wanted" and "For Sale," inserted under this heading at two cents per word agate measure. Minimum price, fifty cents.

FOR SALE—Waverley four-passenger Electric Dos-a-dos; fine condition; used on road as sample. Price, $900. C. O. Reichert, New Haven, Conn.

WANTED position as foreman by man experienced in building electric automobiles, New York. Address MACHINIST, care of The Automobile, New York.

OWNER buying four-passenger Winton, will sell for $975 his new 1900 Standard two-passenger Winton Phaeton, latest model, perfect order. Superior engine. Is very fast. Has been used four weeks. Can be seen in New York and fully tested by purchaser. Address R. E. M., The Automobile, New York.

WANTED.—Second-hand Automobile to seat four; gasoline or steam; must be in good order and all right. "H. P. E.," care THE AUTOMOBILE, 150 Nassau St., New York.

WANTED to buy, second-hand automobile; must be in good condition and cheap for cash. Address AUTO, care of The Automobile, New York.

FOR SALE.—A Winton Motor Carriage; only used enough to be thoroughly tested; a good carriage for cash; makers' price, $1,200; am selling because of buying larger vehicle; trial allowed. J. Gardam, No. 10 Clinton St., Brooklyn, N. Y.

WANTED—To buy two first-class high-grade automobile landaus on monthly installment plan for public use in southern city of eighty thousand with no automobiles; have good livery and carriage business established; would also like local agency for good company. Address Progress, care The Automobile, 150 Nassau St., New York.

FOR SALE OR EXCHANGE for a hansom cab or berlin coach, one electric stanhope. Carriage made by the American Electric Vehicle Company of N. Y. All in good order and in a good condition; or will exchange for a four-passenger electric carriage. Address J. W. Cronin, 577 S. Clinton St., Syracuse, N. Y.

GENERAL MACHINISTS AND

Special Machinery
Experimental Work
Hydraulic Machinery

AUTOMOBILE WORK A SPECIALTY.

HYDRAULIC FORGING IN IRON AND STEEL

The United States Projectile Co., 1st Ave. & 53d Street, **Brooklyn, N. Y.**

We hereby offer our $5.00 8 cell Automobile Gasoline Engine Battery at $4.00 cash, with order. Carriage lig t 9 cell battery, price $5 50 for $4 50 for thirty days, to show you what these cells will do Our Campaign Button without picture is worth as a portable light, $3 00; we offer it now at $1.50, mail prepaid

WILLIAM ROCHE, Inventor and Sole Manufacturer, **42a Vesey St, New York.**

AMERICAN PATENT AUTOMOBILE GAUGES

AND POP SAFETY VALVES

These gauges are made especially for automobile use. They have been adopted by the leading Automobile Manufacturers throughout the United States and Foreign countries.

Simple Accurate Durable

ABSOLUTELY GUARANTEED

Manufactured exclusively by

American Steam Gauge Company

New York BOSTON Chicago

SINGLE STYLE DUPLEX STYLE

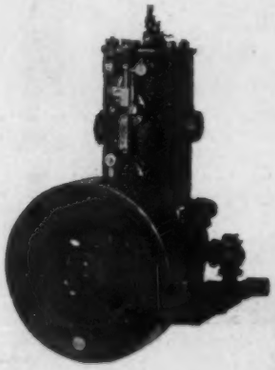
THE LIFE OF AN AUTOMOBILE.

The easy working of the parts and the comfort of the driver

Largely Depends Upon Perfect Lubrication.

Dixon's Pure Flake Graphite Is the only lubricant that can withstand the heat in a gas-engine cylinder. Pure flake graphite perfectly lubricates motor cylinders and all working parts. We prepare Special Lubricants for Gears of Electric Motors and Special Lubricants for Chains of Motor Vehicles. *Correspondence solicited.* Samples free to responsible parties.

JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, N. J.



MOBILE

"WESTCHESTER MODEL"

IMMEDIATE DELIVERIES

Maltby Automobile and Motor Co.

MANUFACTURERS OF

GASOLENE MOTORS for AUTOMOBILES and LAUNCHES

10 Clinton Street, Brooklyn, N. Y.

Personal.

Mr. Alexander Winton is expected to return from abroad about August 15th.

Mr. C. E. Woods has resigned from the active management of the Woods Motor Vehicle Company, of Chicago.

Mr. Chas. B. Shanks, advertising manager of the Winton-Motor Carriage Company, of Cleveland, recently returned from his trip abroad to attend the late international races.

Trade News.

A pamphlet, issued by the Eastman Automobile Co., of Cleveland, O., describes the Eastman automobiles.

The Western Wheel Works, Chicago, is now manufacturing tricycles, using a hydro-carbon motor. The seat is capable of carrying two people.

The Skene Automobile Company, Lewiston, Maine, is out with a very neat catalogue descriptive of its steam carriages, which include stanhope and surrey.

The Eddy Electric Mfg. Co., of Bridgeport, Conn., has under construction a model automobile that will be used to demonstrate the Eddy electric motor for automobiles.

The advantages and high quality of their products are ably set forth in a brochure issued by the Joseph Dixon Crucible Company, Jersey City, N. J. It speaks principally of graphite as a facing for molds, and also mentions the Dixon celebrated core wash.

Sipe & Sigler, of Cleveland, Ohio, manufacturers of storage batteries, have decided to manufacture their own rubber goods. The plant is equipped with the latest machinery for this work, and is located on Superior Street, at the crossing of the Cleveland & Pittsburg Railroad.

The Maltby Automobile & Motor Co., Brooklyn, N. Y., has just secured the selling agency for Brooklyn and Long Island for the "Mobile," the steam carriage manufactured by the "Mobile" Co. of America. Carriages will be on exhibition at their offices, 10 Clinton St. Intending buyers are invited to call and test the vehicle.

The Du Bois Automobile Agency, 220 Broadway, New York, has just issued a very neat little pamphlet, descriptive of its business. The object of the agency is to buy and sell automobiles of different makes and to furnish information desired to intending purchasers of automobiles. The pamphlet also states briefly some of the advantages and disadvantages of the various motive powers used in automobiles.

The Chicago Motor Vehicle Co., Chicago, has recently published a neat, well-printed catalogue, descriptive of its product. The pamphlet, however, as stated in its introductory paragraph, is more in the nature of an introduction to the company than a sample of the styles of vehicles. The catalogue, however, is one that will interest and be found of use by intending purchasers of automobiles.

The "Locomobile" Company of The Pacific is the name of a new company, organized to handle the locomobile on the Pacific Coast manufactured by The "Locomobile" Co. of America. Mr. C. C. Moore, the president, is a well-known engineer and automobile expert. The temporary headquarters of the company is 32 First St., San Francisco, Cal. The territory which this company will control consists of the states of California, Oregon, Washington, Montana, Nevada, Utah, Arizona and New Mexico.

A very artistic and complete catalogue has recently been issued by the Electric Vehicle Company, whose headquarters are at 100 Broadway, New York. On its highly ornamented pages are illustrations of the company's various shops and factories, as well as the complete line of vehicles for pleasure and business purposes, each illustration being accompanied by the data relating it. The catalogue contains 30 pages, is handsomely bound and can be had on application at any one of the company's salesrooms or agencies.

The De Dion-Bouton "Motorette" Co. is rapidly getting its factory at Church Lane and 37th St., Brooklyn, into shape to turn out its new types of automobiles, the "New York" and the "Brooklyn." It is expected carriages will be ready for delivery the latter part of September or the first of October. The "New York" model is to be a three-passenger vehicle, and will be put on the market for $1,200; the "Brooklyn" is to be a two-passenger carriage, price $900. As recently announced, the company has the license for the manufacture of motors under the De Dion-Bouton patents in this country. Quite a number of parts are carried in stock for changing any of the small size (1¾ horse-power) air cooled motors, to a 2¼ horse-power motor, a new cylinder, piston and cylinder head with valves being all that is necessary. The exchange is made at a moderate cost, and those who already have tricycles or quadricycles with these small motors, will do well to communicate with the company, as it is claimed that by enlargening the motors the results obtained are much more satisfactory. A full line of supplies of the De Dion motor parts, batteries and other fittings is also carried.

The Marlboro Automobile & Carriage Co.

is now ready to deliver its steam vehicles in thirty days from receipt of order. These carriages will seat two or four persons. They are honestly built and are equal to, if not better, than any on the market. We can also furnish any and all parts.

THE ENGINE—One of the best; weight, about 80 lbs.; develops up to 6 h.p.; simple, double acting, of our own special design; occupies but 4 x 10 inches space; every part interchangeable; so suspended as to keep the driving chain always under the same tension; can be taken out and replaced in five minutes.

THE BOILER—Also of our own pattern, is furnished in any diameter desired.

Running Gears, Steering Devices, Bodies, Ironed and Finished or in the Rough.

FOR PARTICULARS, CUTS, PRICES, ETC., WRITE

The Marlboro Automobile & Carriage Co., Marlboro, Mass.

Hartford Tires

HARTFORD TIRES for any class of vehicles, from a light speeding wagon to the heaviest automobile, are the most satisfactory tires on the market, because they can be depended upon.

The rubber is of the finest quality, tough and durable, the fabric strong, yet elastic.

In buying automobile or carriage tires, their reputation for quality and durability should be more considered that the first cost.

In the long run it is most economical to purchase the best.

FOR SPEED, COMFORT and DURABILITY,

HARTFORD TIRES

ARE UNEXCELLED BY ANY OTHER TIRE MADE.

Give Your Customers the BEST.

Our reputation will not permit of our making any inferior article.

The Hartford Rubber Works Co., Hartford, Conn.

Automobile Patents Exploitation Company

Undertakes:—The manufacture of Automobiles and Motor-Cycles.
The examination of Automobile patents.
To enlist capital for the development of inventions.

Furnishes:—Specialists to make thorough examinations of patents.
Experts to test motors and automobiles.
Opportunities to inventors to present properly their propositions to concerns willing to consider and to undertake the same.

Purchases:—All meritorious patents, licenses and inventions relating to motor-cycles, motors, gears, automobiles and their parts.

F. B. HYDE, Secretary.

Automobile Patents Exploitation Company,
27 William Street, New York, N. Y.

"Bevin" **Automobile Bell** Two Sizes 3 and 5 in.

Unique in Construction. Most Pleasing in Tone. Easily Attached to Any Vehicle. Insist on Having the Right Thing.

FOR SALE BY ALL DEALERS.

For Sale by
Hartley & Graham
313 Broadway
New York City

Bevin Bros. Manufacturing Co.
East Hampton, Conn.

HALL'S **LOCOBILE**

Conditions found in Steam and Gasoline Carriages
Cylinders are small
High Piston speed.
High temperature in cylinders

They need
An Oil of high fire test
An Oil that will retain its viscosity at high temperature
An Oil that will not decompose with heat
An Oil free from acid

Sold in any Quantity

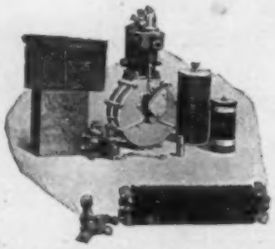
"Locobile" will do the work under these conditions

G. E. HALL, 211 Centre Street, New York

DE DION-BOUTON "Motorette" COMPANY.

Church Lane and 37th St., BROOKLYN-NEW YORK, N. Y.

Sole Agents and Licensed Manufacturers in United States for
DE-DION BOUTON & CO., PATEAUX, FRANCE



MOTORS
AND
"MOTORETTES"

TO REACH OUR OFFICES AND FACTORY—Take 5th Ave. Elevated from Brooklyn Bridge and change at 36th St. to Culver Car to Coney Island or—Take 39th St. Ferry from Battery to 39th St. and then take 39th St. Car. Time 30 Minutes either route.

Patents.

List of Automobile patents granted during month of July.

651,573—Power Propelled Vehicle. Issued to F. W. Lancaster.
650,437—An Automobile. Issued to W. W. Valentine.
650,621—Vehicle Wheel Tire. Issued to A. L. Stevens.
650,478—Gear for Vehicle. Issued to Parry & McClintock.
650,516—Motor Vehicle. Issued to E. E. Molas.
652,949—Automobile Running Gear. Issued to C Cotta.
653,181—Running Gear for Automobiles. Issued to H. M. Quick.
652,851—Self-Propelled Vehicle. Issued to H. W. Libbey.
653,040—Gas Engine. Issued to T. B. Royse.
652,909—Gas Motor. Issued to C. L. Mayhew.
652,989—Rubber Tire for Vehicles. Issued to C. H. Wheeler.
652,890—Pneumatic Tire. Issued to G. H. Clark.
655,967—Pneumatic Tire. Issued to J. A. Jones.
653,200—Independent Motor Vehicle. Issued to J. H. Munson.
653,167-653,172—Motor Vehicles. Issued to C. J. Coleman.
653,102—Motor Vehicle. Issued to C. A. Lieb.
653,199—Motor Vehicle. Issued to J. H. Munson.
652,940-652,944—Motor Vehicle. Issued to G. E. Whitney.
652,852—Motor Vehicle Wheel. Issued to H. W. Libbey.
653,534—Carbureter. Issued to J. E. Shearer.
653,353—Engine Igniter, Explosive. Issued to F. A. Law.
653,497—Pneumatic Tire. Issued to J. Baker.
653,501—Motor Vehicle. Issued to L. C. Clark et al.
653,224—Motor Vehicle. Issued to C. E. Duryea.
653,877—Motor Carriage. Issued to F. A. Perret.
654,101—Pneumatic Tired Wheel. Issued to E. W. McCaslin.
654,027—Pneumatic Wheel. Issued to J. Shellabarger.
653,815—Vehicle Tire. Issued to A. L. Miller.
654,017—Means for Automatically Inflating Pneumatic Tires. Issued to J. A. Mills.
653,723—Pump for Automatically Inflating Pneumatic Tires. Issued to D. Williamson.
653,879—Motor Vehicle. Issued to L. J. Phelps.
653,855—Motor Vehicle. Issued to V. V. Torbensen.
653,801—Motor Driven Vehicle. Issued to R. F Hall.
654,378—Carbureter. Issued to D. Barckdall.
654,478—Motor Cycle. Issued to J. H. Munson.
654,278—Pneumatic Tire Armor or Shield. Issued to W. E. Pugsley.
654,528—Tire, Non-Slipping Pneumatic. Issued to K. A. Enlind.
654,511—Water Feeding and Air Compressing Mechanism for Motor Vehicles. Issued to Bowker & Sherman.

New Books.

YEAR BOOK OF THE UNITED STATES DEPARTMENT OF AGRICULTURE, 1900. Edited by Geo. W. Hill. Government Printing Office, 1900. 880 pages; 63 half-tone illustrations.

This annual report contains an article by Maurice O. Eldridge, acting director of the office of Public Road Inquiries, on "Progress of Road Building in the United States" that is interesting as a brief history of road construction in this country.

A PRACTICAL COURSE IN MECHANICAL DRAWING. By William Fox, M. E., and Charles W. Thomas, M. E. New York: D. Van Nostrand Co. Cloth; 92 pages; 87 illustrations. Price, $1.25.

This book, as the authors state, provides a simple, practical course of progressive lessons in mechanical drawing. The directions for the use of drawing instruments are clearly given, but very briefly. The illustrations are very good and of such a character as to make the book well adapted to the home student. The typographical features are excellent and the book is both helpful and practical in the presentation of the subject.

For Testing Primary or Storage Batteries

USE THE **Eldredge Battery Voltmeter**

0 to 3 Volts Dead Beat

A very convenient and practical instrument for all users of Batteries, either primary or storage. The only instrument of its kind giving the desired voltage.

The strong connecting-posts have non-removable nuts.

Eldredge Electric Mfg. Company,
Springfield, Mass.

Phineas Jones & Co.

Reputation International

All Kinds of Wood Wheels

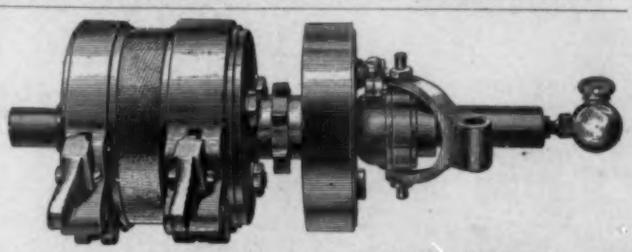
For Automobiles

Established 1855 **Kelly Springfield Tire Used.** **Newark, N. J.**

UPTON TRANSMISSION GEAR

At Last

Here is a PERFECT Gear for all classes of motor carriages.



There is nothing that approaches the Upton Gear in speed, control, durability and general efficiency. It is superior to all others.

ABSOLUTELY DUST PROOF

The Upton Gear may be easily adapted to any kind of gasolene, steam or electric motor vehicle. It has two speeds and reverse. Change of speeds is affected by brakes, and the ratio may be arranged as desired The shaft is in one piece and may be driven direct from motor shaft. The left hand brake operates the reverse which is at slow speed. The brake next to it operates the slow speed ahead. The sprocket drives the axle. The friction clutch at the right locks the whole system and drives it at the speed of the shaft. It has an automatic oiler. The neatest, strongest and most compact gear yet produced.

Every manufacturer and all owners of motor vehicles should examine and test the Upton Gear carefully.

Two Sizes—No. 1, 4 to 5 HP., 35 lbs. No. 2, 7 to 8 HP., 43 lbs.

Write for descriptive circulars, prices, etc., to

Upton Machine Co.
17 State Street
Works at Beverly, Mass. **New York**

ORDERS PROMPTLY FILLED

Portable Rheostats

which enable you to charge your storage batteries from any Edison station or trolley station, while touring.

Also equipments for private stables and for charging stables.

Iron Clad Resistance Co., Westfield, N. J.

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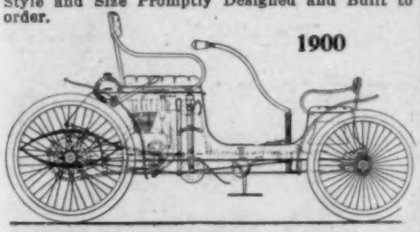

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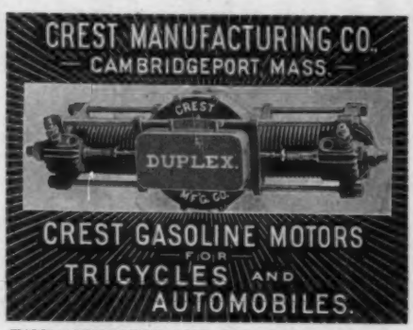

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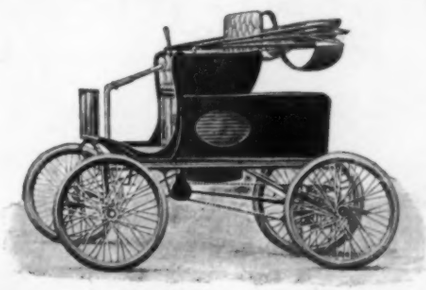

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